Perforator Peroneal Artery Flap for Tongue Reconstruction

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Abstract

Introduction Reconstruction has evolved long way from primary closure to flaps. As time evolved, better understanding of vascularity of flap has led to the development of innovative reconstructive techniques. These flaps can be raised from various parts of the body for reconstruction and have shown least donor site morbidity. We use one such peroneal artery perforator flap for tongue reconstruction with advantage of thin pliable flap, minimal donor site morbidity and hidden scar.

Materials and Methods Our patient 57yrs old lady underwent wide local excision with selective neck dissection. Perforators are marked about 10 and 15 cm inferiorly from the fibular head using hand held Doppler. Leg is positioned in such a way to give better exposure during dissection of the flap and flap is harvested under a tourniquet with pressure kept 350 mm Hg. The perforator is kept at the eccentric location, so as to gain length of the pedicle. Skin incision is placed over the peroneal muscle and deepened unto the deep fascia, then the dissection is continued over the muscle and the perforator arising from the lateral septum. The proximal perforator about 10 cm from the fibular head is a constant perforator and bigger one, which is traced up to the peroneal vessel. We could get a 6 cm of pedicle length. Finally the flap is islanded on this perforator and the pedicle is ligated and flap harvested. Anastomosis was done to the ipsilateral side to facial vessels. The

donor site is closed primarily and in the upper half one can harvest 5 cm width flap without requiring a skin graft along with a length of 8 to 12 cm.

Discussion Various local and free flap has been used for reconstruction of partial tongue defects with its obvious donor site problems, like less pliable skin and not so adequate tissue from local flaps and sacrificing a important artery as in radial forearm flap serves as the work horse in reconstruction of partial tongue defects, Concept of super microsurgery was popularized by Japanese in 1980s and the concept of angiosome proposed by Taylor paved the way for development of new flaps. True perforator flaps are those where the source vessel is left undisturbed and overlying skin flap is raised. Yoshimura proposed cutaneous flap could be raised from peroneal artery (Br J Plast Surg 42:715–718, 1989). Wolff et al. (Plast Reconstr Surg 113:107–113, 2004) first used perforator based peroneal artery flap for oral reconstruction. Location of perforators vary, hence pre operative localisation can be done by ultrasound doppler, CT angio or MR angiography. Disadvantages over radial flap include varying anatomic location of perforators, need for imaging and difficult dissection of delicate vessels through muscles and hence a learning curve. Our patient had an arterial thrombus within few hours post-operatively which was successfully salvaged with immediate re-exploration and re-anastomosis of artery. Post-operative healing was uneventful and donor site was closed primarily without the need for graft.

Conclusions Perforator peroneal flap serves as a useful armamentarium for reconstruction of moderate size defects of tongue, buccal mucosa and floor of mouth with advantages of thin pliable flap, minimal donor site morbidity and hidden scar.

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Fig. 1 Diagrammatic cross-sectional view of peroneal artery flap

Fig. 2 Peroneal artery flap with perforator

Introduction

Reconstruction has evolved a long way from primary closure to flaps. As time evolved, better understanding of vascularity of flap has led to the development of innovative

Fig. 3 Flap inset into partial glossectomy defect

reconstructive techniques. Concept of angiosome proposed by Taylor [1] paved the way for development of new flaps. Flaps with vessel diameter 0.7–1.5 mm, which perforate

Fig. 4 Primary closure of donor site **Fig. 5** Post operative 1 year follow up

the deep fascia before terminating into skin are called “perforators” and flaps raised are called perforator flaps [2]. These flaps can be raised from various parts of the body like thigh, abdomen, forearm, buttock [3]. We describe our experience of perforator based Peroneal flap harvested from lower leg for the reconstruction of tongue defect (Fig. 1).

Surgical Technique

A 57 year old female patient diagnosed with squamous cell carcinoma of right side of tongue cT2N0 underwent wide local excision with selective neck dissection (level I–IV) with prior informed consent. Two team approach was followed. Perforators are marked about 10 and 15 cm inferiorly from the fibular head using hand held Doppler. Leg is then positioned as for harvesting free fibula flap, which is flexion at knee and hip joint. The knee is secured by a roller

bandage to the operating table and the heel is placed firmly on the table with a kidney tray wrapped in cotton and strapped to the table. Finally a sand bag is kept below the pelvis on the ipsilateral side to rotate the lower torso towards the opposite side. This allows a good exposure of the fibula and firm stabilization of the leg, which is important for a trouble free harvest of the flap. A tourniquet is placed over the middle of the thigh and pressure kept 350 mm Hg. The flap is harvested around the perforator keeping the perforator at the eccentric location, so as to gain length of the pedicle. Skin incision is placed over the peroneal muscle and deepened unto the deep fascia, then the dissection is continued over the muscle and the perforator is identified in between the two muscles (peroneus longus anteriorly and soleus posteriorly) which arises from the lateral crural septum. The proximal perforator about 10 cm from the fibular head is a constant perforator and bigger one, which is traced up to the peroneal vessel. One can get at least 5 to 6 cm of pedicle length. Finally the flap is islanded on this perforator (Fig. 2) and the pedicle is ligated and flap harvested. Anastomosis was done on the ipsilateral side to facial vessels. The donor site is closed primarily (Fig. 4) and in the upper half one can harvest 5 cm width flap without requiring a skin graft along with a length of 8 to 12 cm (Figs. 3, 5).

Discussion

Radial forearm flap serves as the work horse in reconstruction of partial tongue defects, but associated morbidity of donor site in about 30–50 %, mainly in the form of graft loss, has been reported [4]. Concept of super microsurgery was popularized by the Japanese in 1980s and the concept of angiosome proposed by Taylor paved the way for development of new flaps [1]. Commonly used perforator based flaps are antero lateral thigh flap (ALT) and deep inferior epigastric flap (DIEP). True perforator flaps are those where the source vessel is left undisturbed and

overlying skin flap is raised [2]. Yoshimura proposed that cutaneous flap could be raised from peroneal artery [5]. Wolff et al. [6] first used perforator based peroneal artery flap for oral reconstruction. Carriquiry divided septocutaneous perforators as medial, anterolateral and posterolateral perforators from peroneal vessels [7]. Location of perforators vary, hence pre operative localisation can be done by ultrasound doppler, CT angio or MR angiography. As quoted in literature, we also felt the advantages of peroneal flap includes excellent pliable soft tissues, hidden scar, skin graft can be avoided in most cases and two team approach [8]. Disadvantages over radial flap include varying anatomic location of perforators, need for imaging and difficult dissection of delicate vessels through muscles and hence a learning curve [8]. Our patient had an arterial thrombus within few hours post-operatively which was successfully salvaged with immediate re-exploration and re-anastomosis of artery. Post-operative healing was uneventful and donor site was closed primarily without the need for graft.

Conclusion

Perforator peroneal flap serves as a useful armamentarium for reconstruction of moderate size defects of tongue, buccal mucosa and floor of mouth with advantages of thin pliable flap, minimal donor site morbidity and hidden scar.

Compliance with Ethical Standards

Conflict of interest No conflict of interest by any of the authors.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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